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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/534,625	11/06/2006	David R. Wulfman	96196	8632

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EXAMINER	
LAM, ANN Y	
ART UNIT	PAPER NUMBER
1641	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/534,625	WULFMAN ET AL.	
	Examiner	Art Unit	
	ANN Y. LAM	1641	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11 May 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *117* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *5/15/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-9 and 15-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Li, 6704104.

Li discloses a detection system that allows for simultaneously measuring theresponse of multiple fluorophores from each site within an array. Li discloses that the invention involves using a spectrometer to spectrally obtain simultaneously the total fluorescence spectrum resulting from multiple fluorophores. Based on the total observed fluorescence spectrum, deconvolution techniques can be used to resolve the amount of multiple individual fluorophores in the sample. Within a given spectral range, deconvolution techniques allow more fluorophores to be resolved than by using filters. Therefore, more samples can be multiplexed within each site of the array to increase throughput and accuracy of differential gene expression measurements. Multiplexing a group of spectrally close dyes allows more efficient excitation using a single excitation source (col. 3, lines 34-55.) Figure 6 shows the deconvolution of fluorescence

intensities measured (col. 5, lines 3-4.) Li discloses providing a fluorescence detector having sufficient resolution, i.e., a sufficiently small point spread function, to measure fluorescence even from high density arrays (col. 8, lines 52-64.)

In a preferred arrangement (figure 3a) a laser 20 is used to provide excitation light 24 to illuminate a row of sites, which extend parallel to one another. Preferably, the wavelength content of the excitation light is selected to excite fluorescence from each fluorophore present in a site. Alternatively, a laser simultaneously lasing at a plurality of discrete wavelengths may be used to provide excitation light.(col. 9, lines 6-23.)

A beam steering optic such as a mirror 502 can be provided to direct the xcitation light to illuminate one or more sites. A galvonometer 504 can be provided to impart computer-controlled motion to the beam steering optic to cause the excitation light to lluminate a plurality of sites in sequence, such as to scan a row or array of sites (col. 9, lines 24-35.)

When the fluorophores at a site are illuminated by the laser, the fluorophores fluoresce and produce an incoming light 26, represented by broken lines. Lines 602 also represent an optical path from the diffracting element to the detector (col. 9, lines 45-59.)

The detector may be a CCD 31 for example. Detector 31 includes a preferably rectangular array of rows and columns of pixels. A suitable light detector suitable includes an array of light sensitive elements to sense the fluoresced light. Each light

sensitive element is configured to measure an intensity of light impinging thereon (col. 9, line 60 – col. 10, line 26.)

From the detector array 31 within the camera 30, the detected intensities are sent to a processing unit, such as a personal computer 34 (col. 10, lines 27-39.) If the array of site to be illuminated is small enough that all of the sites can be arranged to fit simultaneously within the field of view of the detector, all of the sites can be illuminated by using the beam steering device to direct the excitation light sequentially to each site without having to move the sites with respect to the detector. Alternatively, the array of sites to be illuminated may not fit within the field of view of the detector. In this case, the substrate supporting the sites can be moved with respect to the detector to bring new sites within the field of view of the detector. The substrate to be moved is secured, preferably releasably, on a platform 506, which preferably comprises a translation stage 507. Translation stage 507 preferably allows the substrate to be moved in at least one and preferably two dimensions with respect to the detector, such as an x dimension 508 and a y dimension 510 (col. 10, lines 40-59.)

Using a combination of sequentially scanning the excitation light from site to site and moving the sites with respect to the detector, an entire array of sites can be illuminated. To scan an array, the excitation light can be directed to sequentially illuminate a row or array of sites that are presently within the field of view of the detector. Subsequently, the platform moves the sites with respect to the detector, such as in at least one of the x and y dimensions, to bring different sites within the field of

view of the detector. Once the new sites are present within the field of view, the excitation light can be directed to illuminate the newly viewed sites. Preferably, the directing of the excitation light and the site motion are controlled by computer (col. 10, line 61 – col. 11, line 12.)

Figures 4a and 4b show an embodiment to allow more than one site to be illuminated simultaneously by the excitation light. After the excitation light passes through a beam expander, it can illuminate a plurality of sites 519 at a given instant (col. 11, line 6 – col. 12, line 14.) Alternatively, one or more beam splitters 522 may be used to separate the excitation light into a plurality of excitation beams 524. Each excitation beam 524 can be directed to illuminate a single site at any given moment. The combination of excitation beams 524, therefore, illuminates a plurality of sites simultaneously (col. 12, lines 14-31.)

Thus, as to claim 1, Li disclose a spot detection system comprising a light source adapted to move relative to a waveguide (the substrate upon which the materials to be analyzed are located), a photodetector statically positioned (as is understood from col. 10, line 61 - col. 11, line 12) at an edge of the waveguide (see fig. 3a for example), the output of which is continuously or quasi-continuously collected and correlated with the excitation light source position (col. 10, line 61 – col. 11, line 12) wherein spot detection is achieved through characterization of the photo detector output relative to the excitation light position (col. 3, lines 34-55, col. 8, lines 52-64, col. 9, lines 6-23, and col. 12, lines 14-31.)

As to claims 2, 3, the means for deconvolution of fluorescence (col. 3, lines 34-55, col. 5, lines 3-4) is the means for discerning between fluorescence of closely spaced spots co-located on the same waveguide as recited by Applicant.

As to claims 4, 8, 16,when the array is small the detection, and thus convolution, can be taken across the entire field of spot loci on the waveguide col. 10, lines 40-59.)

As to claims 5, 9, the de-convolution is a function of known fluorescent spot locations (col. 3, lines 34-55, col. 5, lines 3-4.)

As to claims 6, 7, 15, the means for discerning the intensity of the fluorescence emission signals between spots is the means for deconvolution of intensities measured from the array, which may be a dense array (col. 5, lines 3-4, and col. 8, lines 52-64.)

As to claim 17, the prior characterization of known intereference is the characterization of the array with known spots.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 10-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li, 6704104.

Li discloses the invention substantially as claimed (see above discussions), except for moving the detector. However, Li discloses moving the light source or the platform which moves the sites with respect to the detector, to bring different sites within the field of view of the detector. Once the new sites are present within the field of view, the excitation light can be directed to illuminate the newly viewed sites (col. 10, line 61 – col. 11, line 12.) The skilled artisan would have recognized that providing a system wherein the detector moves and the platform is stationary produces the same effect as that disclosed by Li, in bringing different sites within the field of view of the detector. Such equivalence readily recognizable by the skilled artisan thus renders the substitution obvious.

As to claims 11 and 12, it would have been obvious to the skilled artisan that in a system where the detector moves, such modifications include providing an output of which is continuously or quasi-continuously collected and correlated with the detector's position, in order to detect and discern the individual spots and fluorescence (see col. 10, line 61 – col. 11, line 12.)

As o claim 13, hen the array is small the detection, and thus convolution, can be taken across the entire field of spot loci on the waveguide col. 10, lines 40-59.)

As to claim 14, the prior characterization of known intereference is the characterization of the array with known spots.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANN Y. LAM whose telephone number is (571)272-0822. The examiner can normally be reached on Mon.-Fri. 10-6:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Long Le can be reached on 571-272-0823. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Ann Y. Lam/
Primary Examiner, Art Unit 1641